

**AMENDMENTS TO THE CLAIMS**

1. (Currently Amended) A solid state brachytherapy applicator for performing radiation therapy treatment in an animal body, said applicator ~~at least~~ comprising an x-ray emitting surface composed of:

an x-ray emitting surface;

a vacuum cavity having spatial geometry and containing a cathode and an anode spaced apart at ~~some~~ a first distance from each other;

emitting means for emitting free electrons from the cathode;

electric field means for applying ~~during use~~ a high-voltage electric field between said cathode and said anode for accelerating said emitted free electrons towards said anode; ~~wherein~~

said vacuum cavity being at least partly transparent to X-ray radiation emitted by said anode;

~~characterized in that~~ said vacuum cavity is ~~bound~~ being bound by first and second plate-shaped elements spaced ~~some~~ at a second distance from each other, said first plate-shaped element serving as said cathode and said second plate-shaped element serving as said anode, said first and second plate shaped elements having longitudinal dimensions substantially greater than said first distance; and

wherein during use said x-ray emitting surface is brought into contact with tissue of the animal body to be treated thereby emitting x-ray radiation having a dose contribution conformal to the spatial geometry of the vacuum cavity.

2. (Currently Amended) Solid state brachytherapy applicator according to claim 1, ~~characterized in that~~ wherein between said first and second plate-shaped elements spacers of high insulating material are present between said first and second plate-shaped elements.

3. (Currently Amended) Solid state brachytherapy applicator according to claim 1, ~~characterized in that~~ wherein a getter material is provided on the surface of said first plate-shaped element facing away from said second plate-shaped element.

4. (Currently Amended) Solid state brachytherapy applicator according to claim 3, ~~characterized in that~~wherein said first plate-shaped element is provided with at least one opening exposing said getter material to said vacuum cavity.

5. (Cancelled)

6. (Currently Amended) Solid state brachytherapy applicator according to claim 5, ~~characterized in that~~wherein the solid state brachytherapy applicator is connected to a distal end of a guiding wire for insertion towards said desired location within an animal body.

7. (Currently Amended) Solid state brachytherapy applicator according to claim 1, ~~characterized in that~~wherein said first plate-shaped element serving as cathode is of a gated field emission type containing a ferro-electric electron emitting material ~~or carbon nanotubes~~.

8. (Currently Amended) Solid state brachytherapy applicator according to claim 7, ~~characterized in that~~wherein said ferro-electric electron emitting material is positioned between a lower electrode and an upper electrode, both electrodes being connected to a driving voltage.

9. (Currently Amended) Solid state brachytherapy applicator according to claim 8, ~~characterized in that~~wherein said lower electrode is ~~built~~built up from several electrode segments, the segments of said electrode being electrically isolated from each other and each separately being connected to said driving voltage.

10. (Currently Amended) Solid state brachytherapy applicator according to claim 9, ~~characterized in that~~wherein said electrode segments of said lower electrode are each separately connected to said driving voltage via a multiplexer.

11. (Currently Amended) Solid state brachytherapy applicator according to claim 8, ~~characterized in that~~wherein said upper electrode is constructed as an electrically conductive

sheet provided with a large number of openings serving as emitting holes for the emitted free electrons.

12. (Currently Amended) Solid state brachytherapy applicator according to claim 11, ~~characterized in that~~wherein said openings have a polygonal shape, ~~for example round, square, hexagonal, etc.~~

13. (Currently Amended) Solid state brachytherapy applicator according to claim 8, ~~characterized in that~~wherein said upper electrode is constructed as at least one electrically conductive frame in which a large number of disc shaped elements partly is fixed on the ferro-electric electron emitting material.

14. (Currently Amended) Radiation therapy treatment system for performing radiation therapy treatment in an animal body at least comprising:

a doses planning device for preplanning a radiation therapy treatment within said animal body using a solid state brachytherapy applicator ~~according to claim 1;~~

said brachytherapy applicator including:

an x-ray emitting surface;

a vacuum cavity having spatial geometry and containing a cathode and an anode spaced apart at a first distance from each other;

emitting means for emitting free electrons from the cathode;

electric field means for applying a high-voltage electric field between said cathode and said anode for accelerating said emitted free electrons towards said anode;

said vacuum cavity being at least partly transparent to X-ray radiation emitted by said anode;

said vacuum cavity being bound by first and second plate-shaped elements spaced at a second distance from each other, said first plate-shaped element serving as said cathode and said second plate-shaped element serving as said anode, said first and second plate shaped elements having longitudinal dimensions substantially greater than said first distance; and

wherein during use said x-ray emitting surface is brought into contact with the tissue of animal body to be treated thereby emitting x-ray radiation having a dose contribution conformal to the spatial geometry of the vacuum cavity;

control means for driving said solid state brachytherapy applicator according to the preplanned therapy treatment; and

one or more radiation detectors positioned in the near vicinity of said source device in said animal body for measuring the actual radiation dose distribution generated by said solid state brachytherapy applicator, and wherein said radiation therapy treatment system is arranged for delivering feedback information to the control means to adapt the dose according to the preplanned treatment parameters.

15. (Currently Amended) Method for performing radiation therapy treatment in an animal body using a radiation therapy treatment system, said system comprising:  
a doses planning device for preplanning a radiation therapy treatment within said animal body using a solid state brachytherapy applicator;

said brachytherapy applicator including:

an x-ray emitting surface;

a vacuum cavity having spatial geometry and containing a cathode and an anode spaced apart at a first distance from each other;

emitting means for emitting free electrons from the cathode;

electric field means for applying a high-voltage electric field between said cathode and said anode for accelerating said emitted free electrons towards said anode;

said vacuum cavity being at least partly transparent to X-ray radiation emitted by said anode;

said vacuum cavity being bound by first and second plate-shaped elements spaced at a second distance from each other, said first plate-shaped element serving as said cathode and said second plate-shaped element serving as said anode, said first and second plate shaped elements having longitudinal dimensions substantially greater than said first distance; and

wherein during use said x-ray emitting surface is brought into contact with the tissue of animal body to be treated thereby emitting x-ray radiation having a dose contribution conformal to the spatial geometry of the vacuum cavity;

control means for driving said solid state brachytherapy applicator according to the preplanned therapy treatment; and

one or more radiation detectors positioned in the near vicinity of said source device in said animal body for measuring the actual radiation dose distribution generated by said solid state brachytherapy applicator, and wherein said radiation therapy treatment system is arranged for delivering feedback information to the control means to adapt the dose according to the preplanned treatment parameters

according to claim 14 and a solid state brachytherapy applicator according to claim 1.

16. (New) Solid state brachytherapy applicator according to claim 1, wherein said first plate-shaped element serving as cathode is of a gated field emission type containing carbon nanotubes.